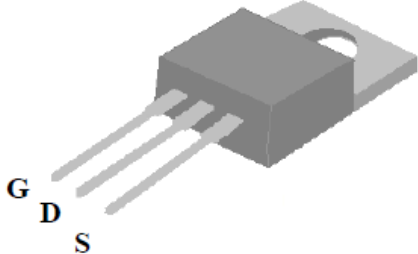
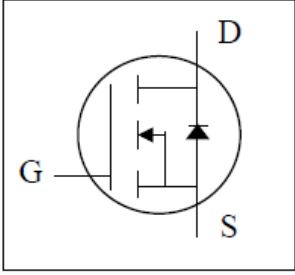





<p style="text-align: center;"><u>TO-220AB</u></p>  	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="background-color: #e1f5fe;">Features</th> </tr> <tr> <td style="padding: 5px;"> <ul style="list-style-type: none"> Simple drive requirement Low gate charge Fast switching characteristic Halogen free </td> <td style="text-align: center; vertical-align: middle;">  </td> </tr> <tr> <th colspan="2" style="background-color: #e1f5fe;">General Description</th> </tr> <tr> <td colspan="2" style="padding: 5px;"> <p>SiPower provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.</p> </td> </tr> <tr> <th colspan="2" style="background-color: #e1f5fe;">Applications</th> </tr> <tr> <td colspan="2" style="padding: 5px;"> <p>The TO-220AB package is widely preferred for commercial-industrial power applications and suited for low voltage applications such as DC/DC converters.</p> </td> </tr> </table>	Features		<ul style="list-style-type: none"> Simple drive requirement Low gate charge Fast switching characteristic Halogen free 		General Description		<p>SiPower provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.</p>		Applications		<p>The TO-220AB package is widely preferred for commercial-industrial power applications and suited for low voltage applications such as DC/DC converters.</p>	
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BV_{DSS}	40V												
$R_{DS(ON)}$	4m Ω												
I_D	160A												
Absolute Maximum Ratings													
Parameter	Symbol	Rating	Unit										
Drain-Source Voltage	V_{DS}	40	V										
Gate-Source Voltage	V_{GS}	± 20	V										
Continuous Drain Current (Chip)	$I_D @ T_C = 25^\circ C$	160	A										
Continuous Drain Current, $V_{GS} @ 10V^3$	$I_D @ T_C = 25^\circ C$	80	A										
Continuous Drain Current, $V_{GS} @ 10V^3$	$I_D @ T_C = 100^\circ C$	80	A										
Pulsed Drain Current ¹	I_{DM}	300	A										
Total Power Dissipation	$P_D @ T_C = 25^\circ C$	187	W										
Storage Temperature Range	T_{STG}	-55 to 175	$^\circ C$										
Operating Junction Temperature Range	T_J	-55 to 175	$^\circ C$										

Thermal Data			
Parameter	Symbol	Value	Unit
Maximum Thermal Resistance, Junction-case	Rthj-c	0.8	°C/W
Maximum Thermal Resistance, Junction-ambient	Rthj-a	62	°C/W

Electrical Characteristics @Tj=25°C(unless otherwise specified)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	40	-	-	V
Static Drain-Source On-Resistance ²	R _{DS(ON)}	V _{GS} =10V, I _D =40A	-	-	4	mΩ
		V _{GS} =4.5V, I _D =30A	-	-	5	mΩ
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1	-	3	V
Forward Transconductance	g _{fs}	V _{DS} =10V, I _D =30A	-	80	-	S
Drain-Source Leakage Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V	-	-	25	uA
Gate-Source Leakage	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
Total Gate Charge	Q _g	I _D =30A V _{DS} =32V V _{GS} =4.5V	-	25	40	nC
Gate-Source Charge	Q _{gs}		-	6.5	-	nC
Gate-Drain ("Miller") Charge	Q _{gd}		-	14	-	nC
Turn-on Delay Time	t _{d(on)}	V _{DS} =20V	-	11	-	ns
Rise Time	t _r	I _D =30A	-	62	-	ns
Turn-off Delay Time	t _{d(off)}	R _G =2.4Ω	-	30	-	ns
Fall Time	t _f	V _{GS} =10V	-	9	-	ns
Input Capacitance	C _{iss}	V _{GS} =0V	-	2800	4500	pF
Output Capacitance	C _{oss}	V _{DS} =25V	-	590	-	pF
Reverse Transfer Capacitance	C _{rss}	f=1.0MHz	-	165	-	pF
Gate Resistance	R _g	f=1.0MHz	-	1.6	2.4	Ω

Source-Drain Diode						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Forward On Voltage ²	V _{SD}	I _S =40A, V _{GS} =0V	-	-	1.2	V
Reverse Recovery Time	t _{rr}	I _S =10A, V _{GS} =0V,	-	41	-	ns
Reverse Recovery Charge	Q _{rr}	dI/dt=100A/μs	-	47	-	nC

Notes:

1. Pulse width limited by Max. junction temperature.
2. Pulse test
3. Package limitation current is 80A.

Typical Characteristics Curve

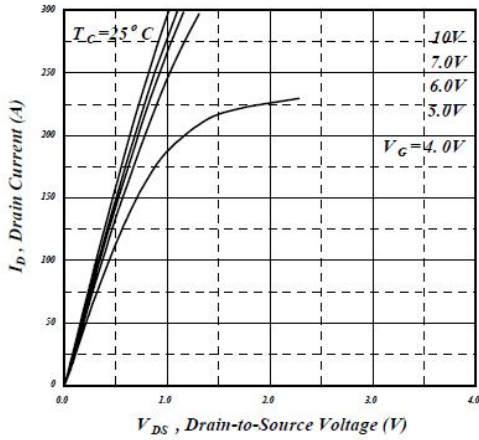


Figure 1. Typical Output Characteristics

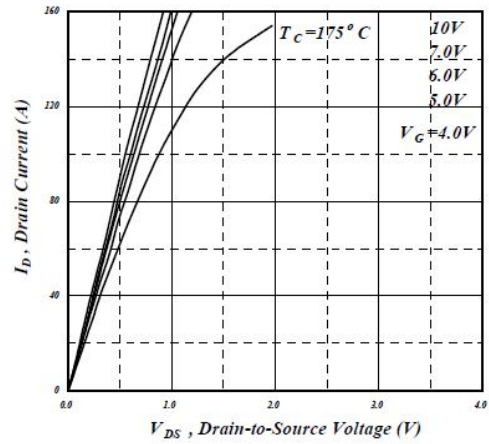


Figure 2. Typical Output Characteristics

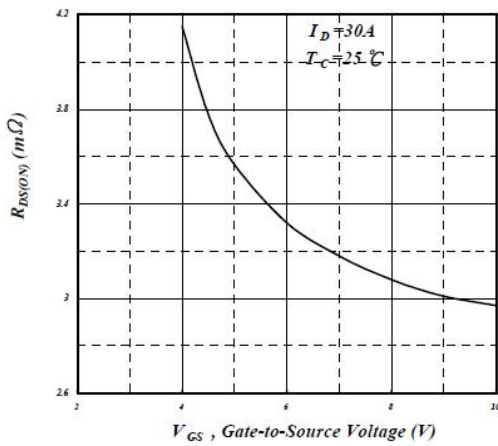


Figure 3. On-Resistance v.s. Gate Voltage

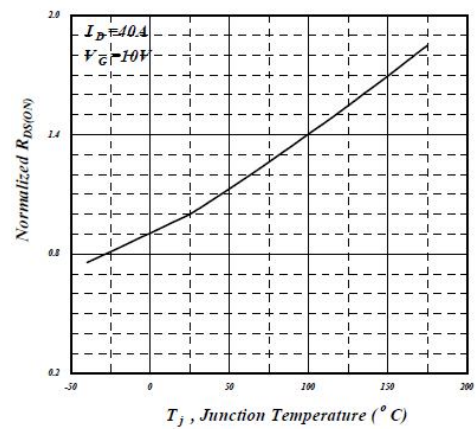


Figure 4. Normalized On-Resistance v.s. Junction Temperature

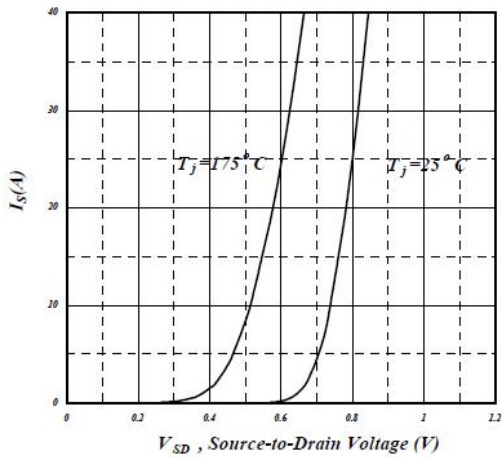


Figure 5. Forward Characteristic of Reverse Diode

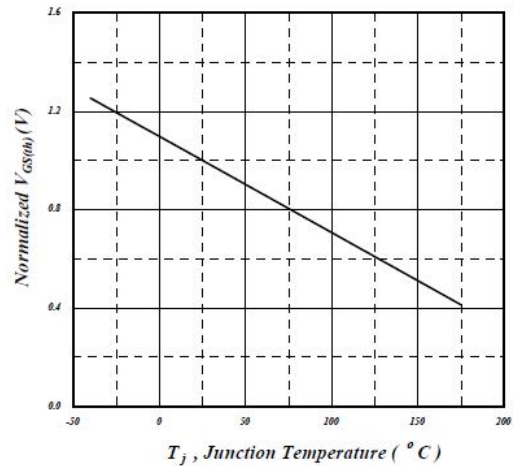


Figure 6. Gate Threshold Voltage v.s. Junction Temperature

Typical Characteristics Curve

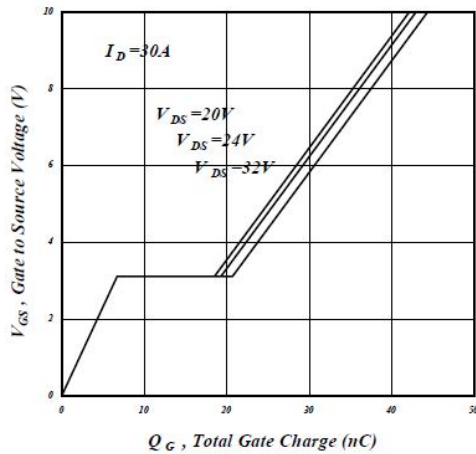


Figure 7. Gate Charge Characteristics

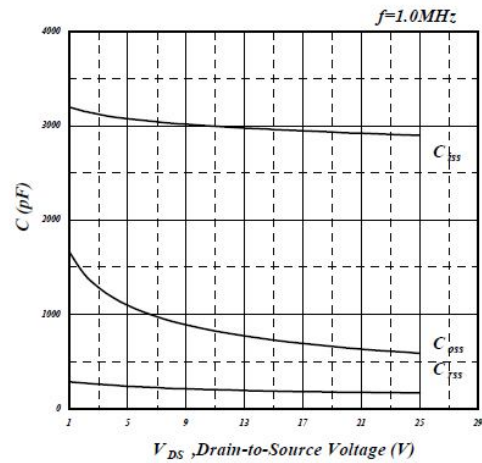


Figure 8. Typical Capacitance Characteristics

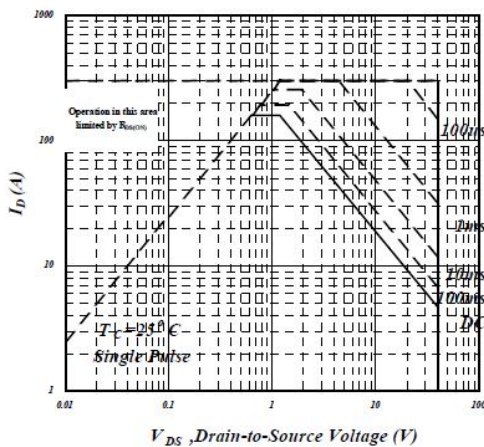


Figure 9. Maximum Safe Operating Area

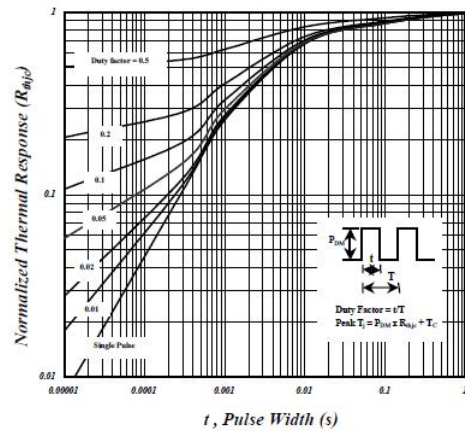


Figure 10. Effective Transient Thermal Impedance

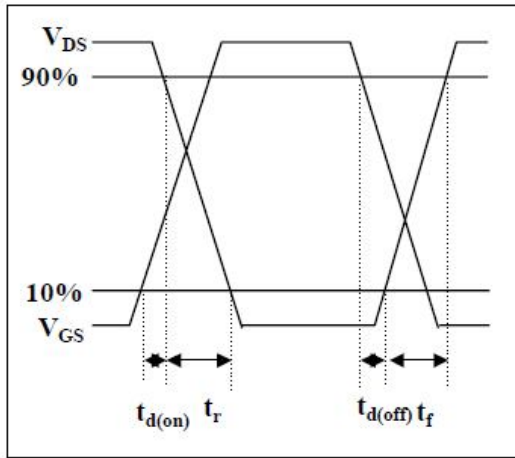


Figure 11. Switching Time Waveform

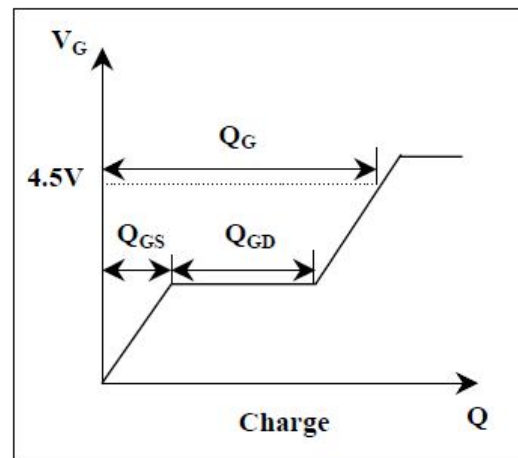
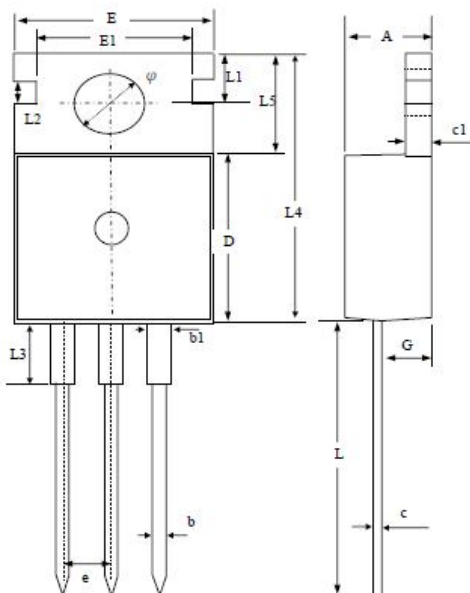


Figure 12. Gate Charge Waveform

Note

This product is sensitive to electrostatic discharge, please handle with caution. Use of this product as a critical component in life support or other similar systems is not authorized. SiPower does not assume any liability arising out of the application or use of any product or circuit described. Herein; neither does it convey any license under its patent rights, nor the rights of others. SiPower reserves the right to make changes without further notice to any products herein to improve reliability, function or design.

Package Outline Dimensions



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.20	4.50	4.80
b	0.60	0.80	1.00
b1	1.10	1.38	1.80
c	0.30	0.48	0.65
c1	1.10	1.30	1.50
E	9.70	10.00	10.40
E1	7.40	8.30	9.20
e	2.54 (ref.)		
L	12.70	13.60	14.50
L1	2.50	2.75	3.00
L2	1.00	1.40	1.80
L3	2.60	3.35	4.10
L4	14.30	15.15	16.00
L5	6.00	6.40	6.80
phi	3.40	3.70	4.00
D	8.30	8.85	9.40
F	—	—	—
G	1.89	2.49	3.09

1. All Dimensions Are in Millimeters.
2. Dimension Does Not Include Mold Protrusions.

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